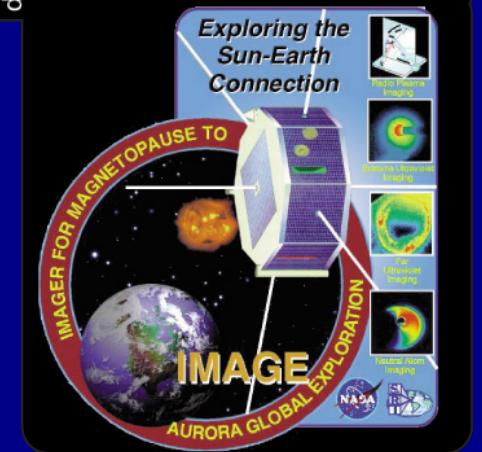


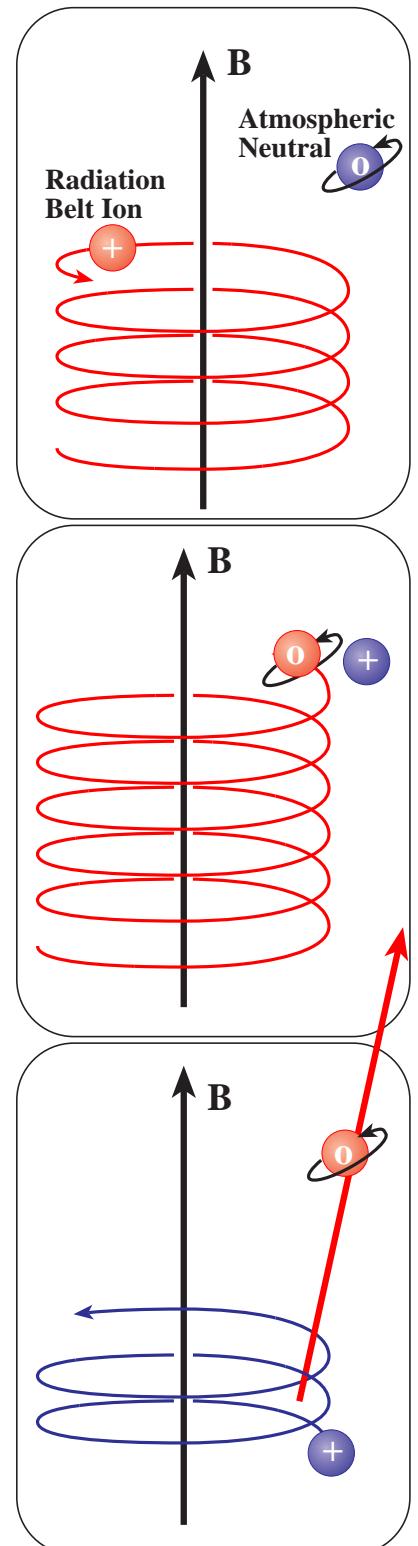
Simultaneous ENA Observations of Ring Current Injection from IMAGE and POLAR



G. D. Reeves, M. G. Henderson, R. M. Skoug, H. O. Funsten,
M. F. Thomsen, C. J. Pollock, J.-M. Jahn, D. J. McComas,
J. B. Blake, J. F. Fennell, H. E. Spence, D. G. Mitchell,
E. C. Roelof, and the Polar and Image Teams.

Overview & Objectives

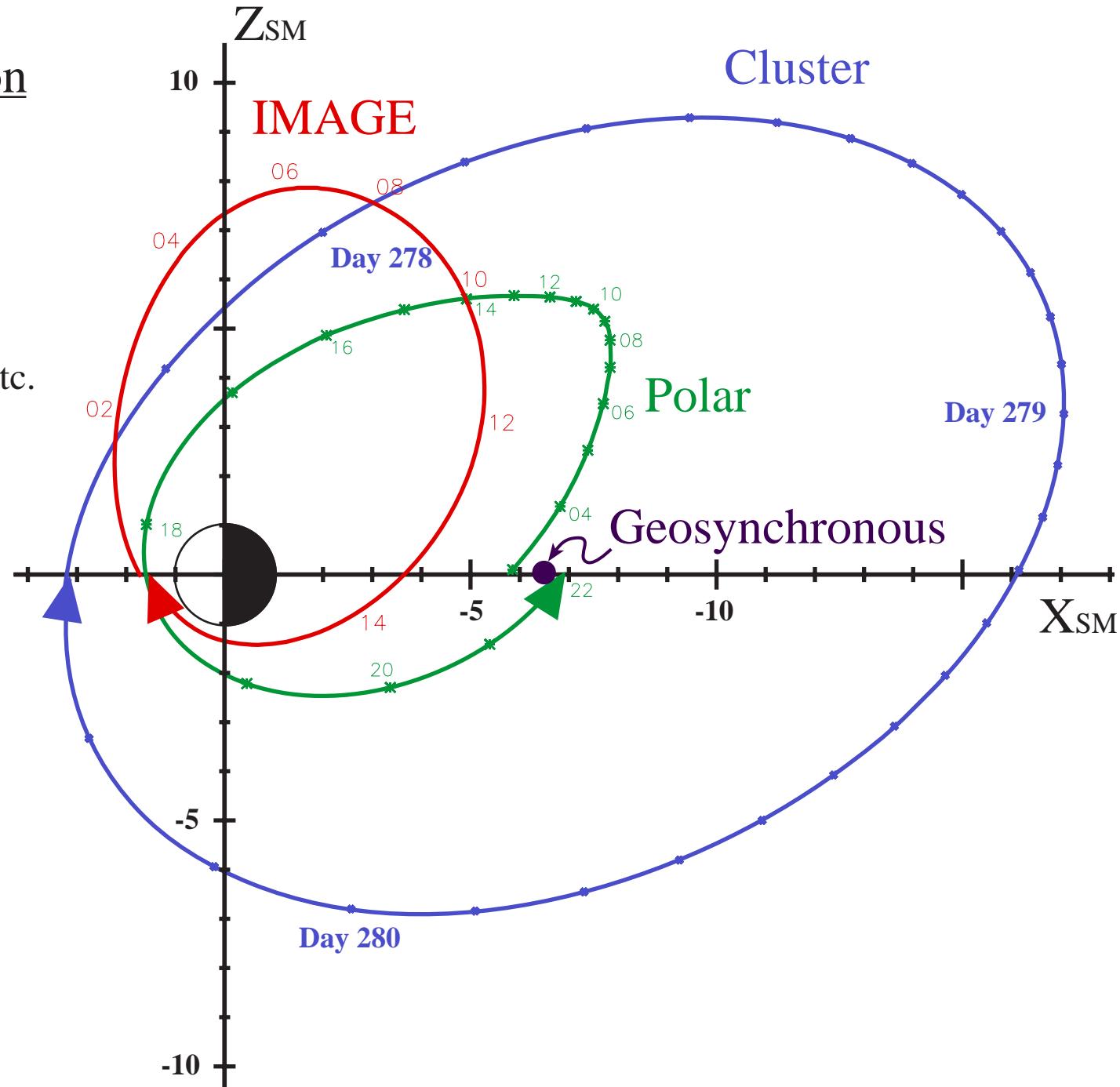
- First, qualitative comparison of simultaneous ENA images from Polar and Image
 - We compare the ENA signatures from a series of ring current injections, concentrating on October 4, 2000, 09:39 UT
- Develop quantitative comparison of Polar, Image, and “combined/stereo” ENA images
 - We can determine the source ion distributions using ENA observations from Polar, from Image, or from both spacecraft simultaneously. The results of all three “inversions” can be quantitatively compared.
 - We present the first steps toward this goal by inverting the Polar ENA observations to determine the trapped ion distribution and compare the resulting “synthetic” ENA image with Image ENA observations
 - Quantitative comparison is done for the quiet ring current on October 6 during the recovery phase of this storm



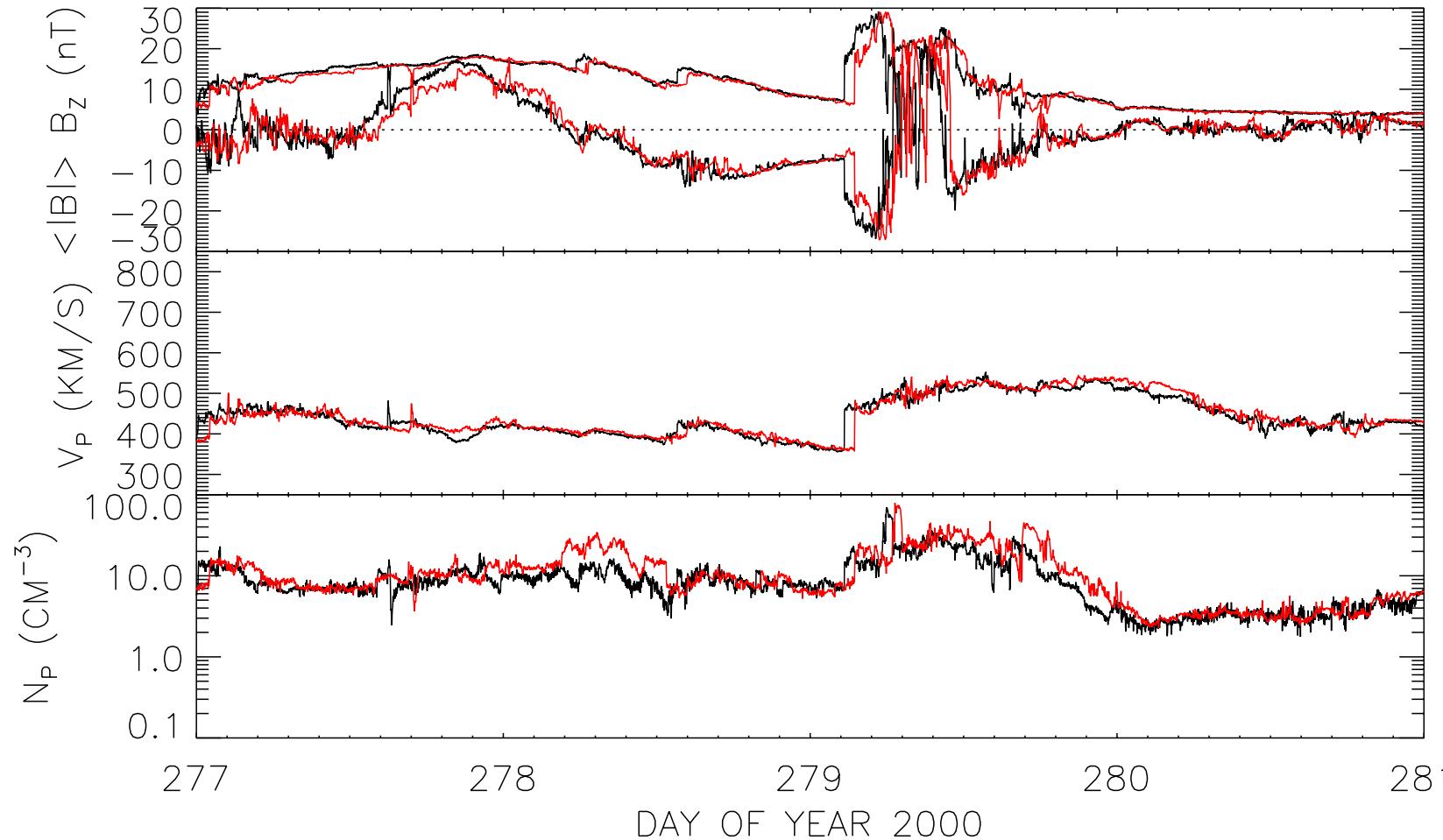
Spacecraft Configuration

October 4, 2000
Day 278

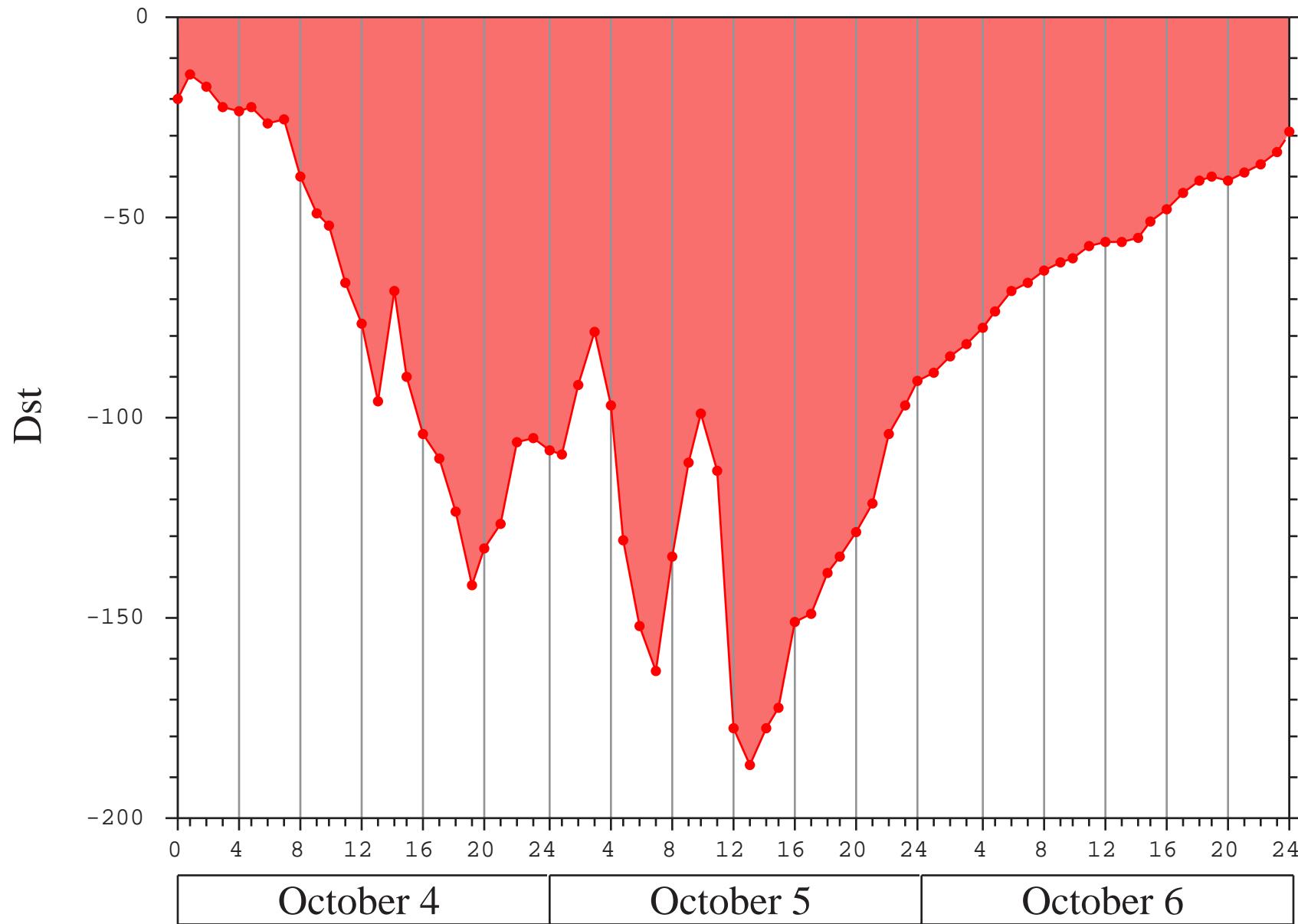
- ENA Images Available From:
IMAGE MENA, HENA, etc.
POLAR IPS
(CLUSTER RAPID)
- Polar and Image nearly co-planar in X-Z plane
- Polar crosses equator at \approx geosynchronous orbit
- ACE at \approx 225, 30 Re
- WIND at \approx 32, -213 Re



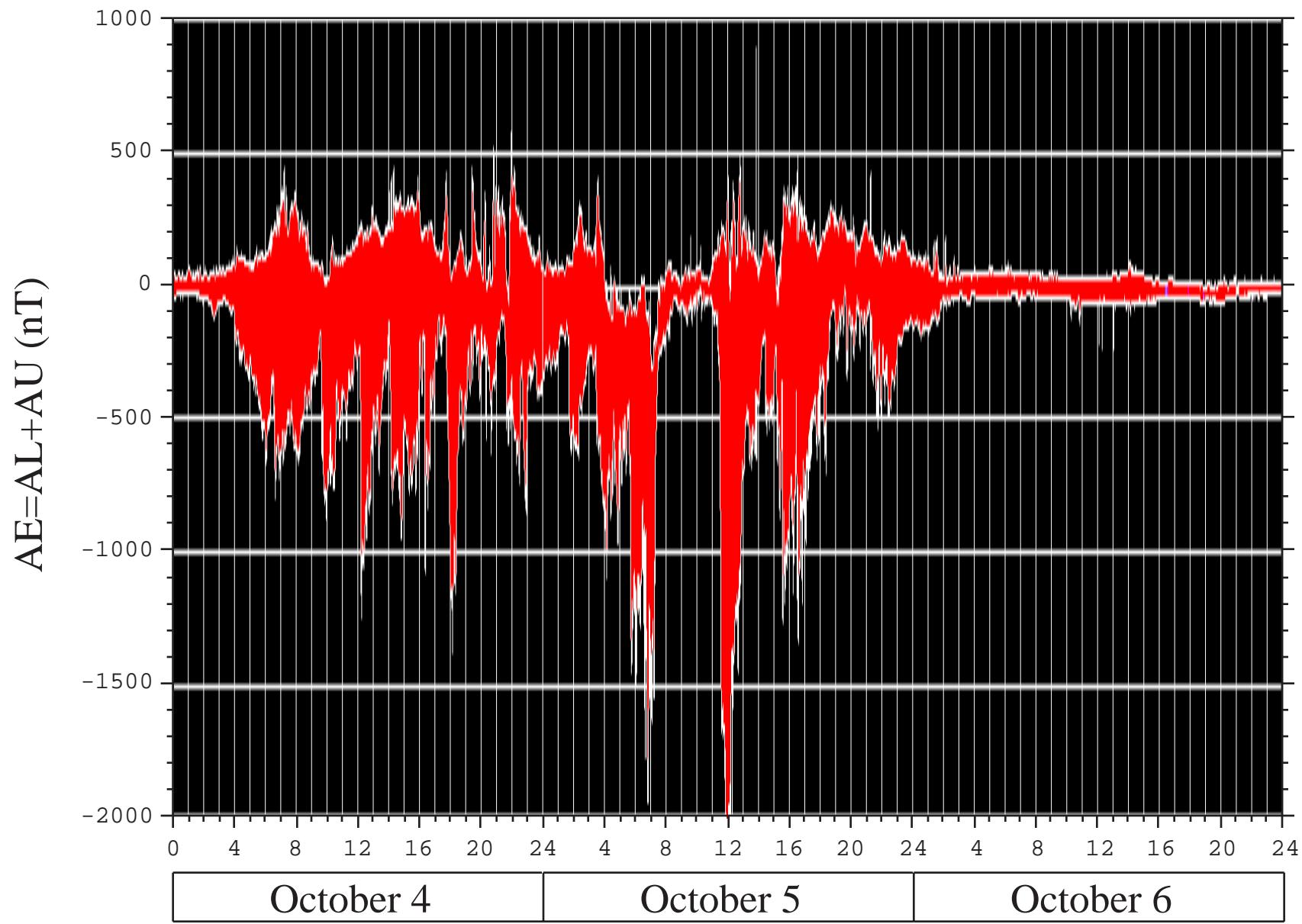
ACE SWEPAM ACE MAG WIND SWE WIND MAG



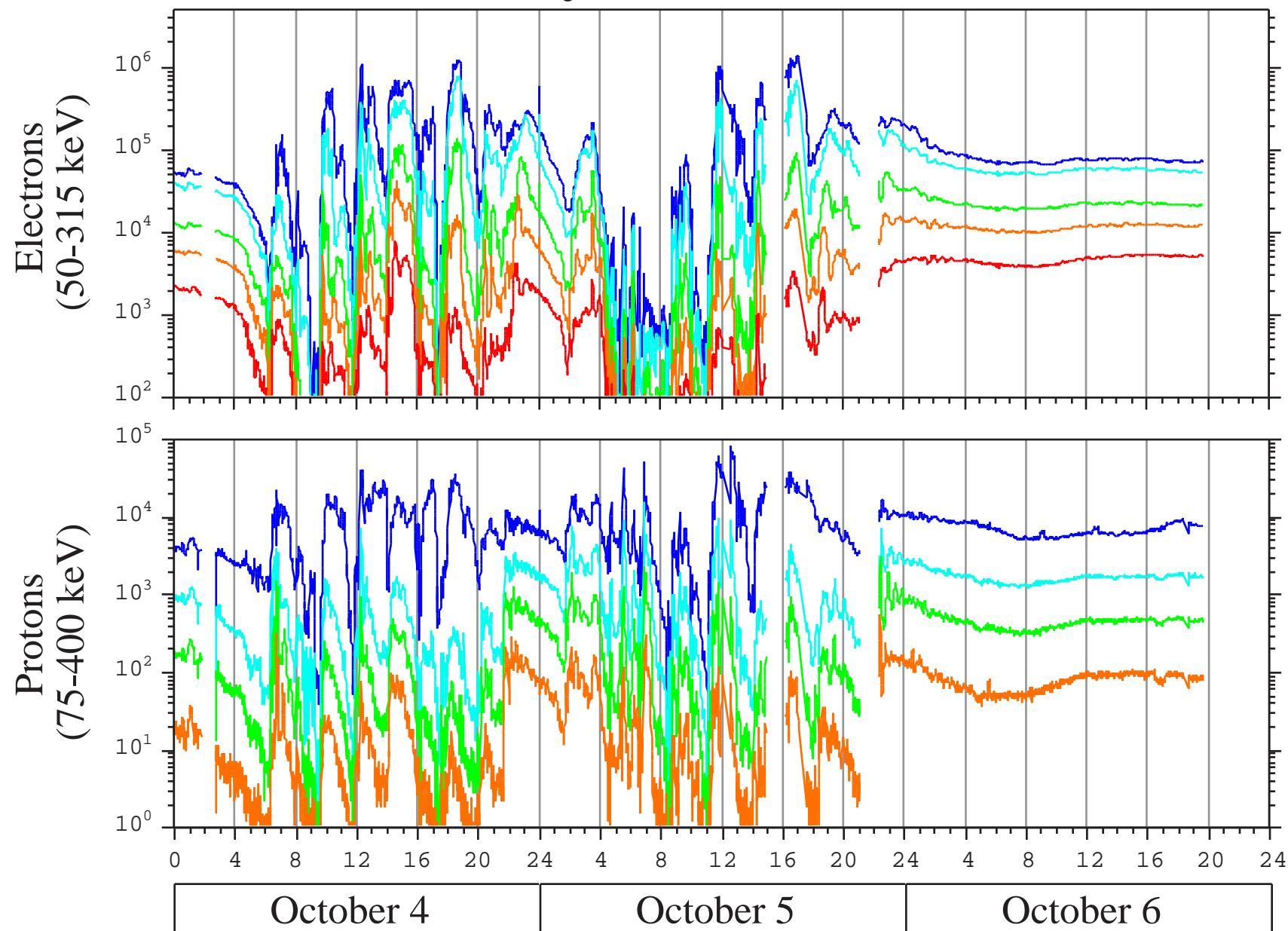
Dst Index



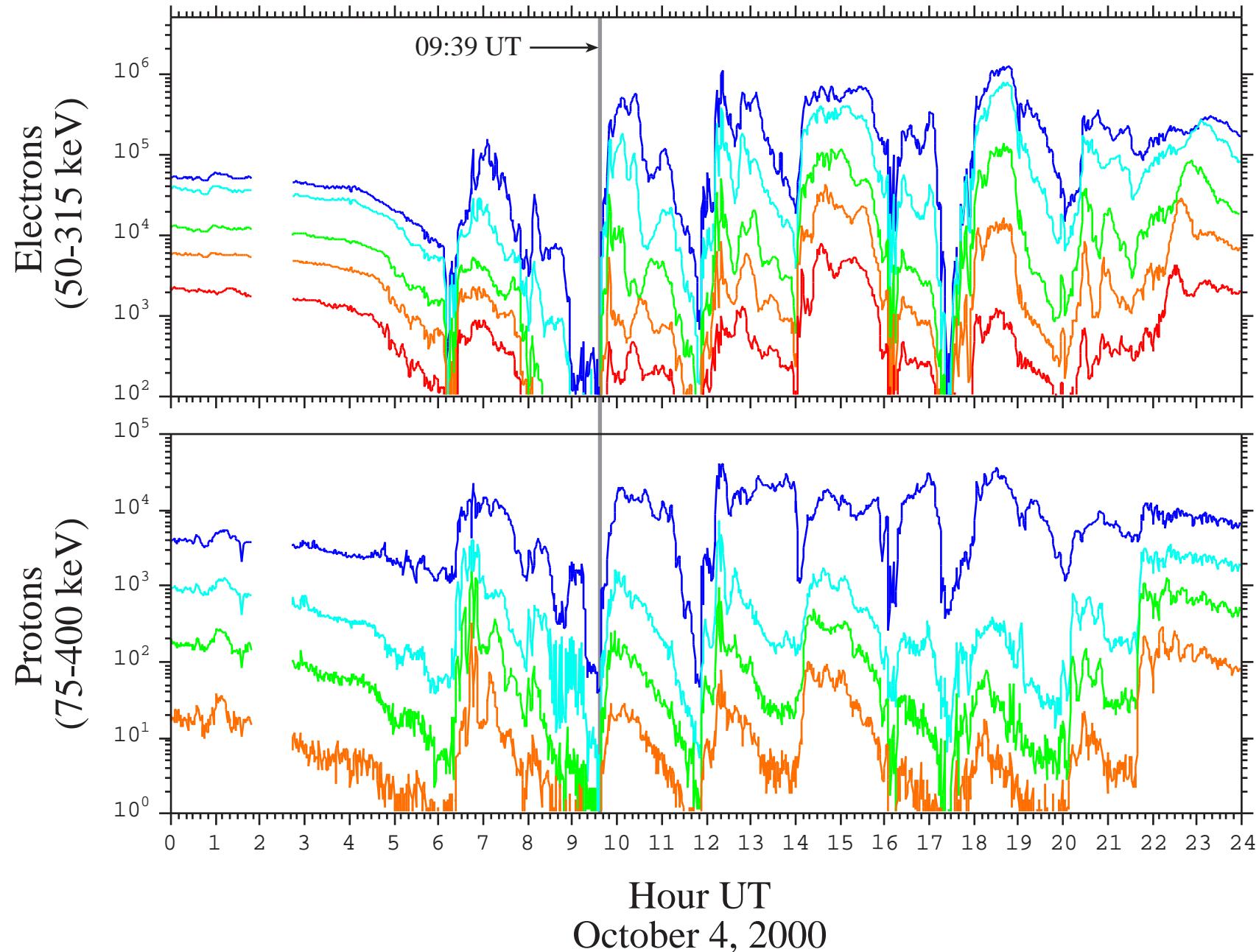
Preliminary AE Index



LANL Geosynchronous (1989-046)



LANL Geosynchronous (1989-046)



Polar IPS

IPS
Azimuth Roll Plot ($E > 37.5 \text{ keV}$)

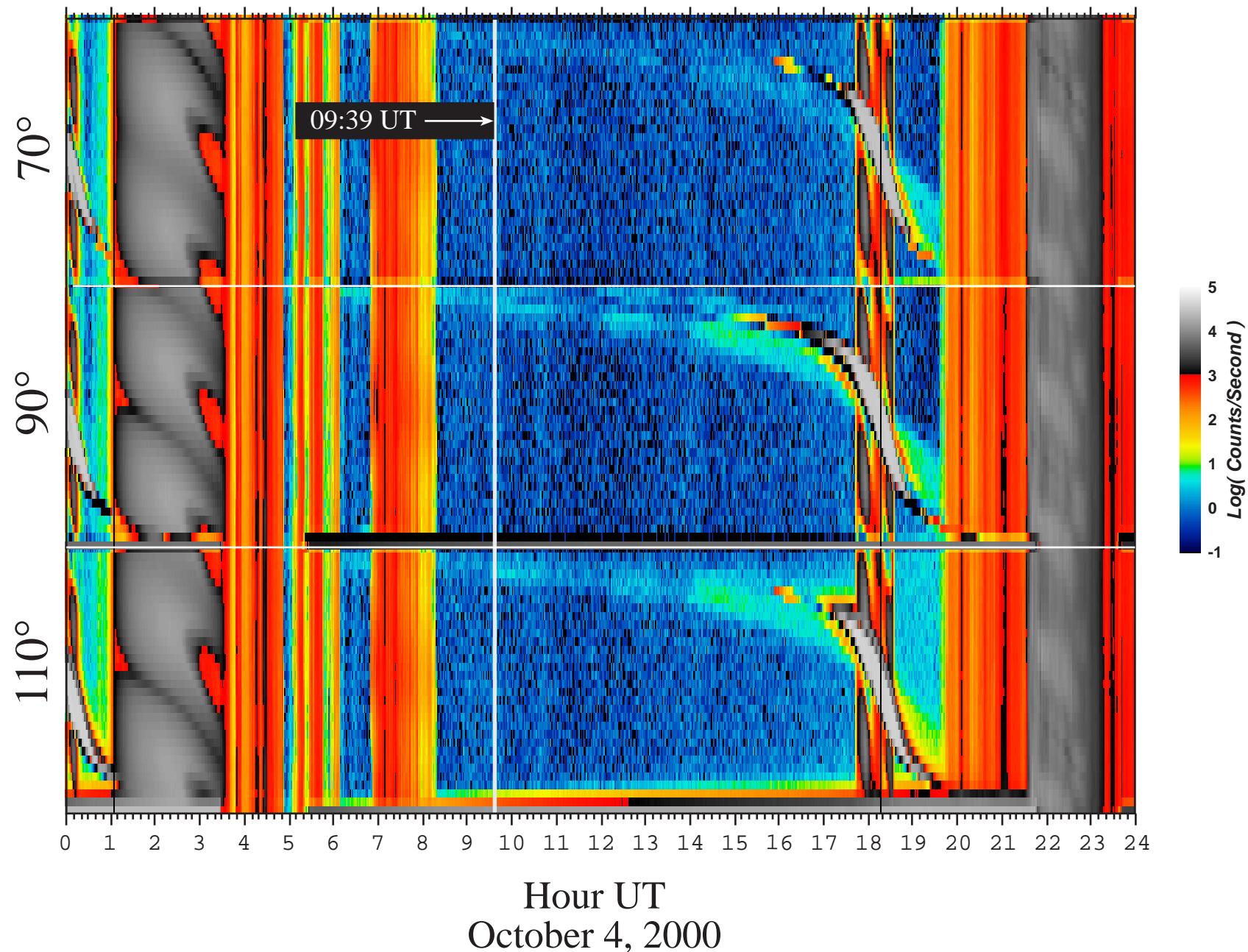


Image MENA

MENA
Azimuth Roll Plot ($E > 1$ keV)

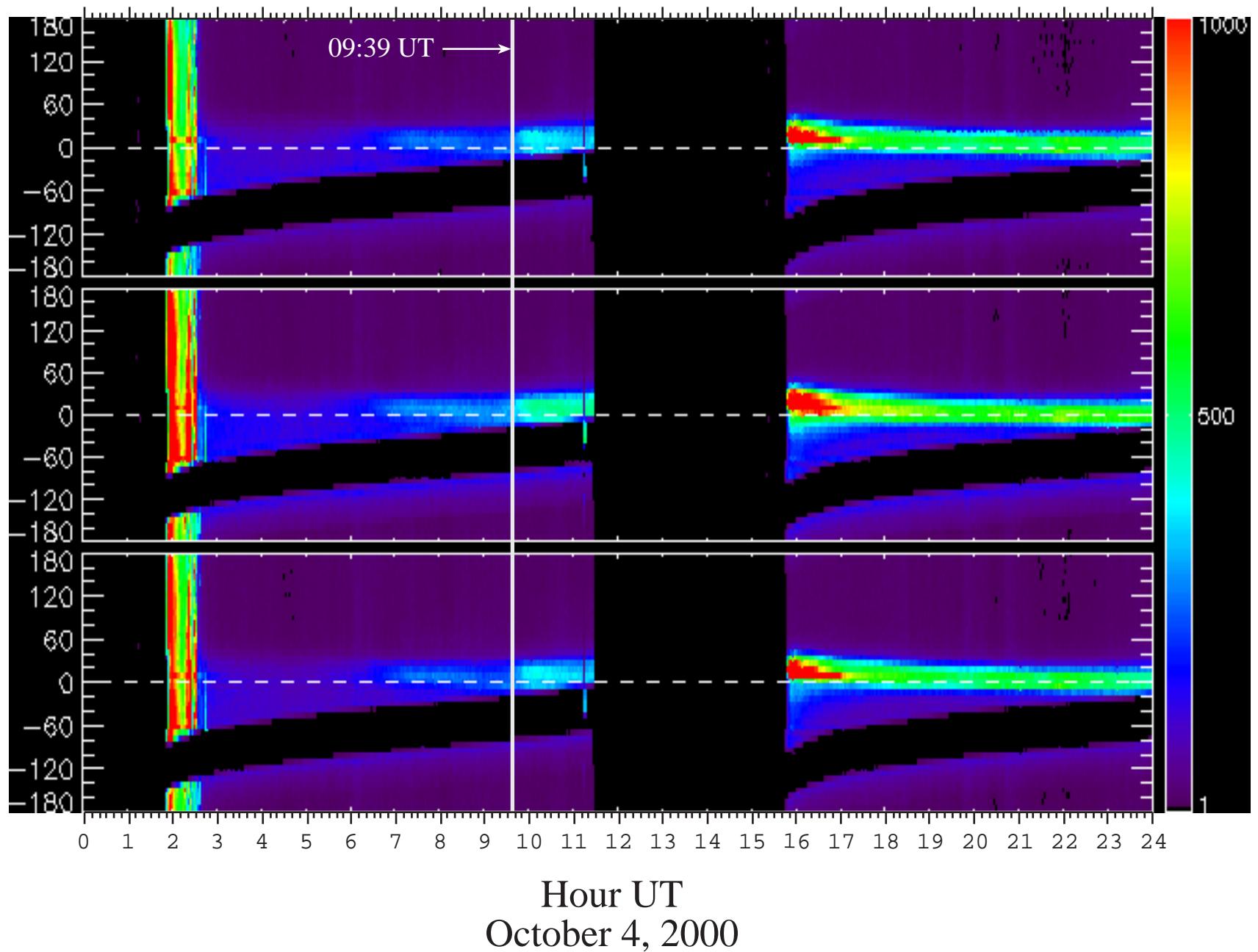


Image HENA

HENA Elevation Angle Spectrogram

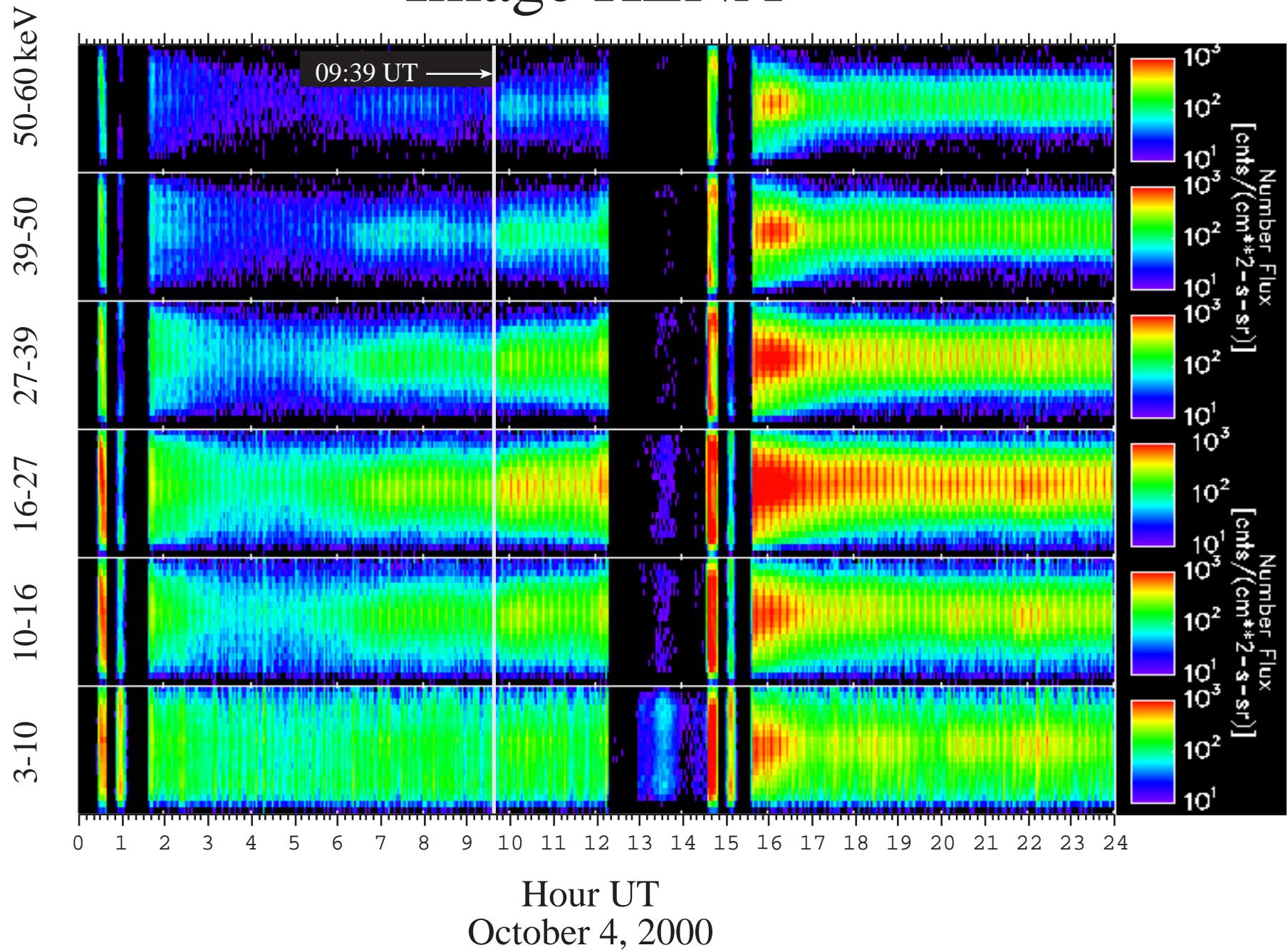
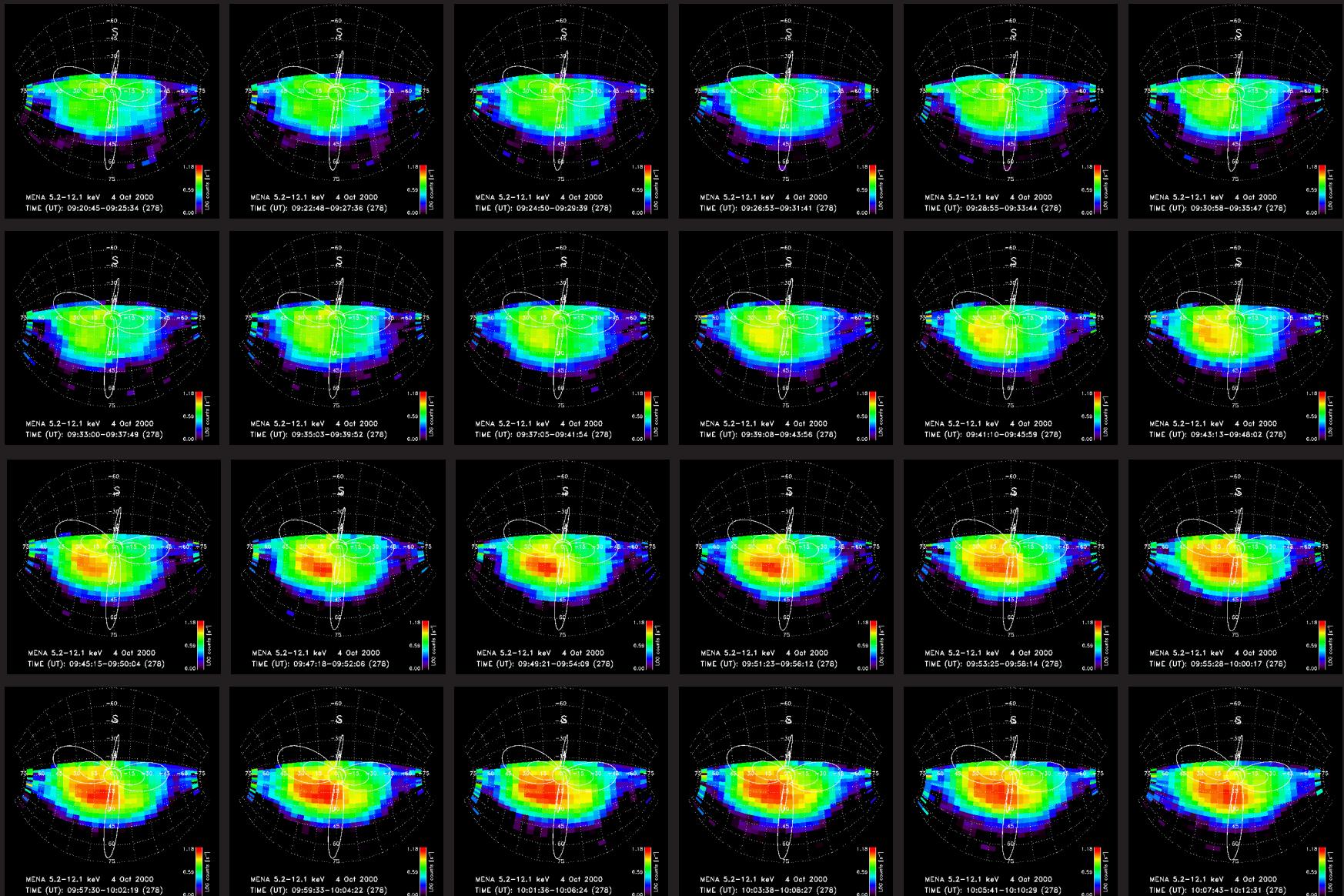


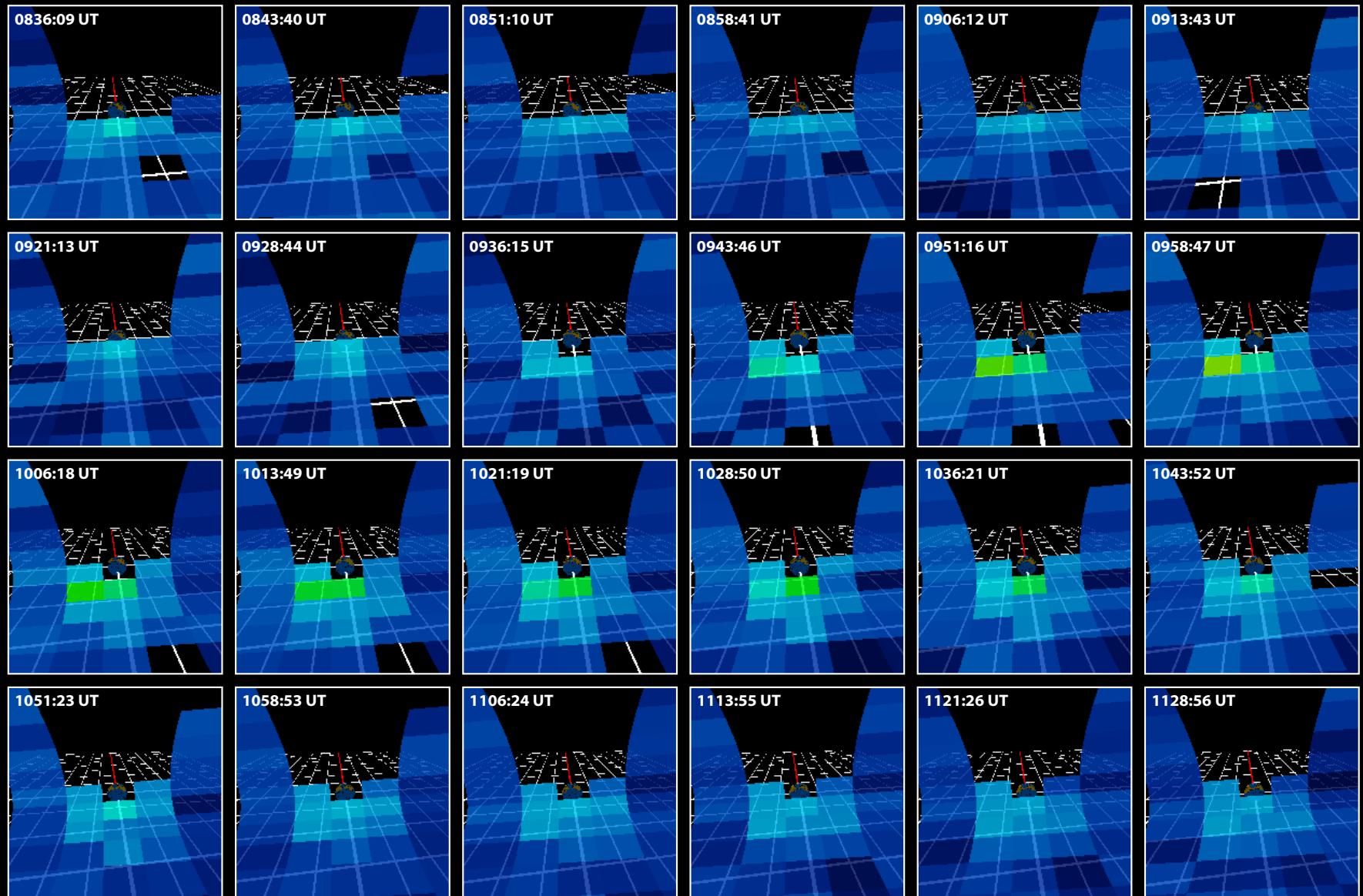
IMAGE MENA 5.2-12.1 keV

October 4, 2000



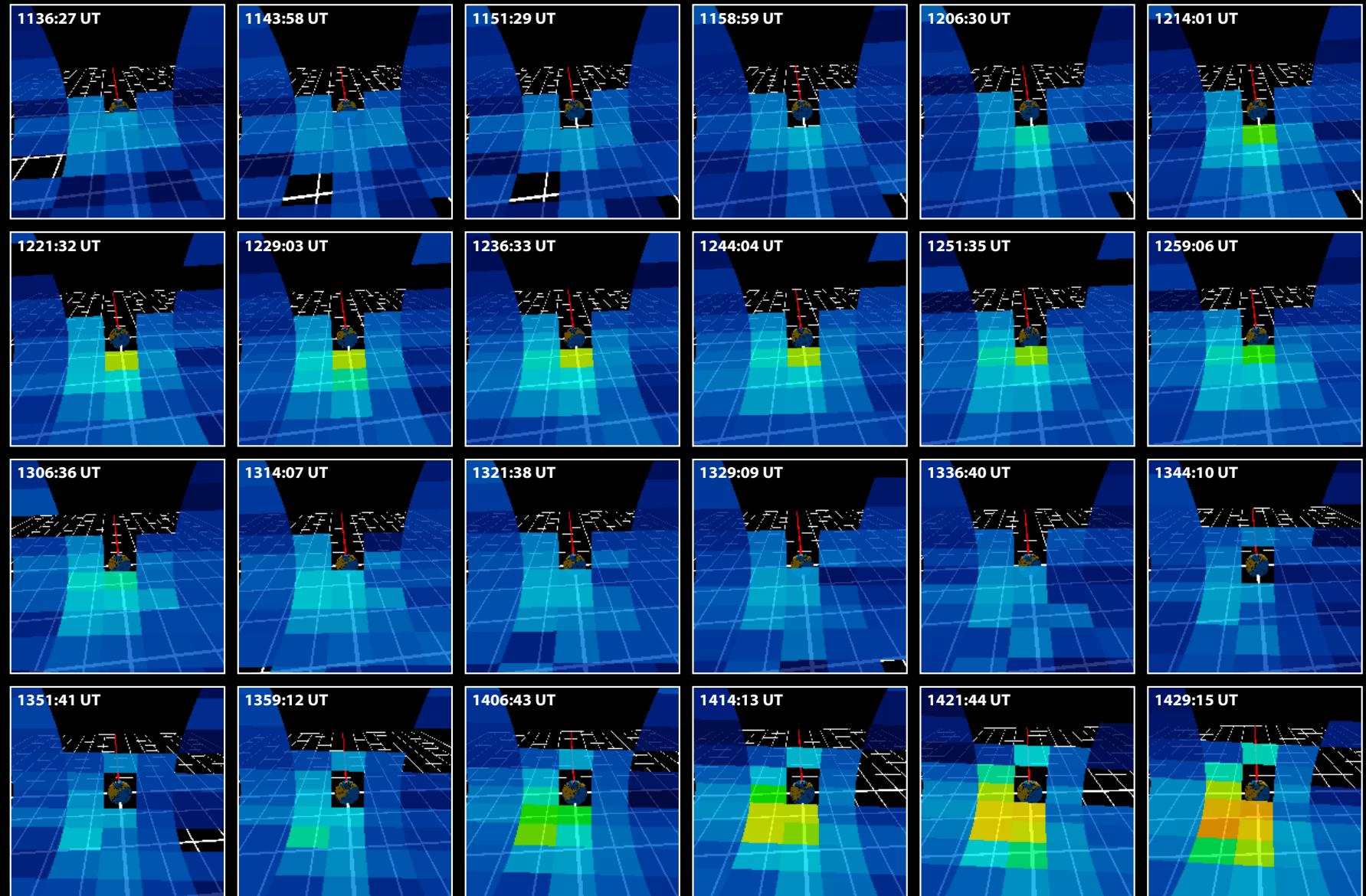
POLAR CEPPAD/IPS ENA Images

October 4, 2000



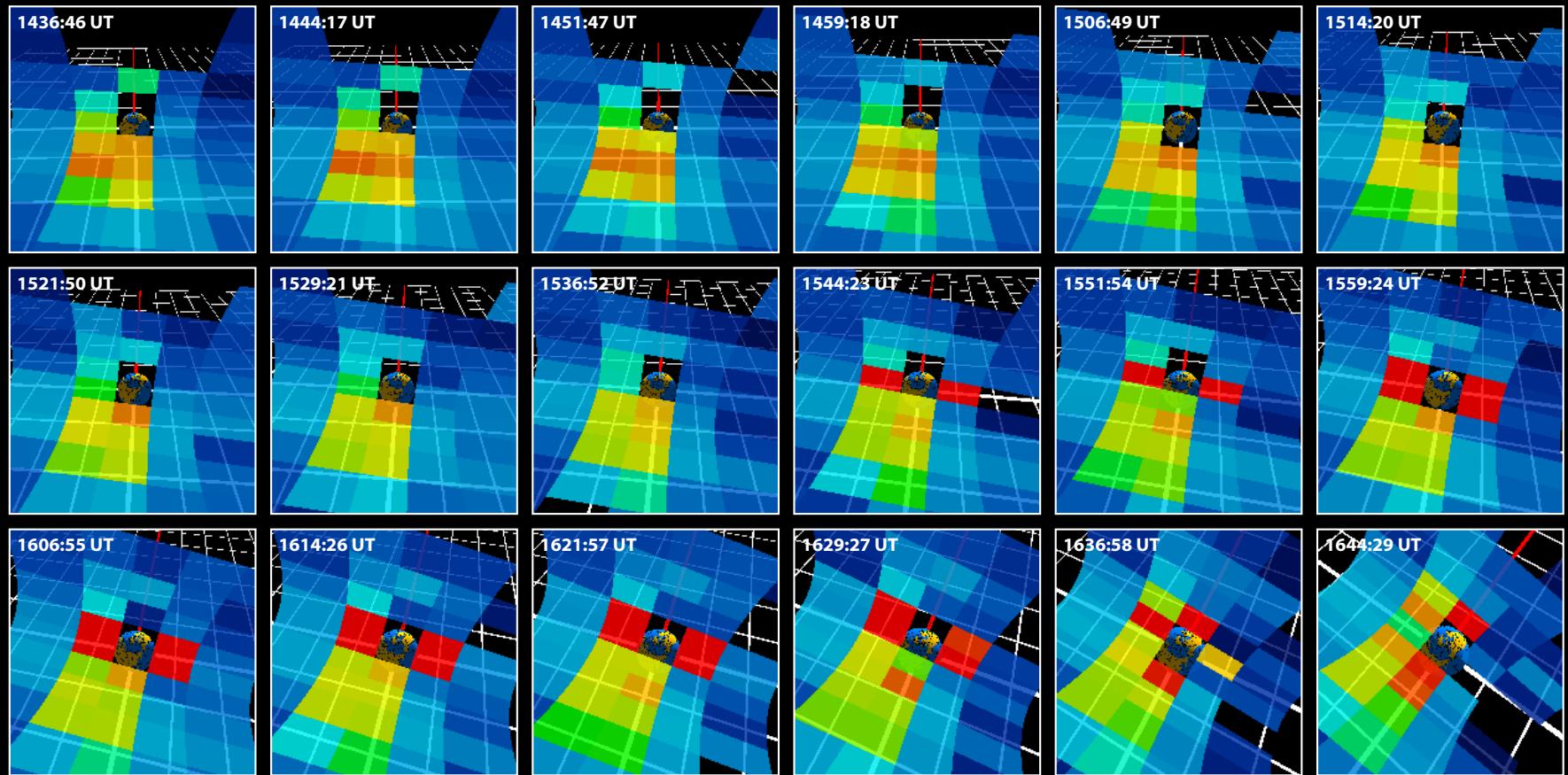
POLAR CEPPAD/IPS ENA Images

October 4, 2000



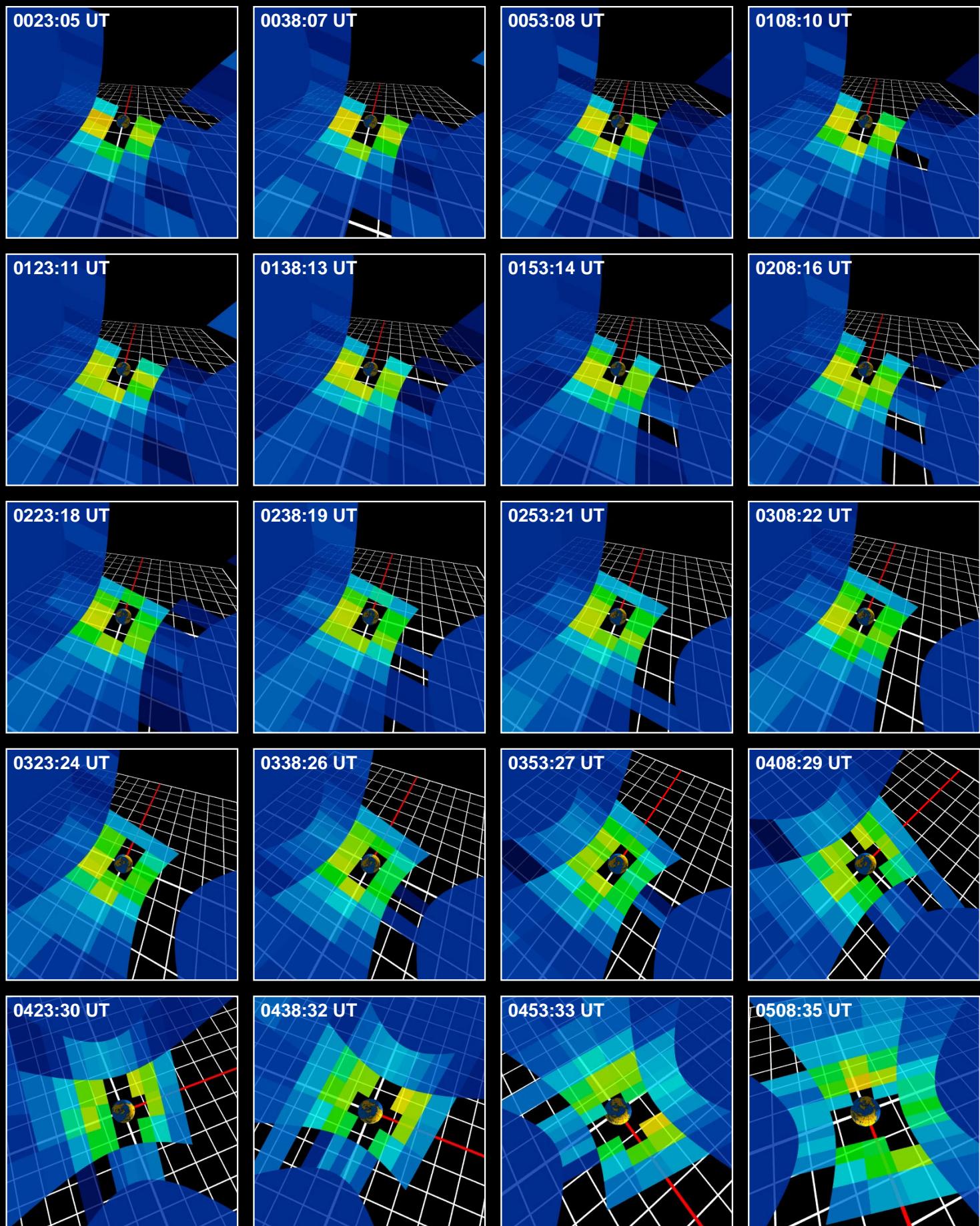
POLAR CEPPAD/IPS ENA Images

October 4, 2000



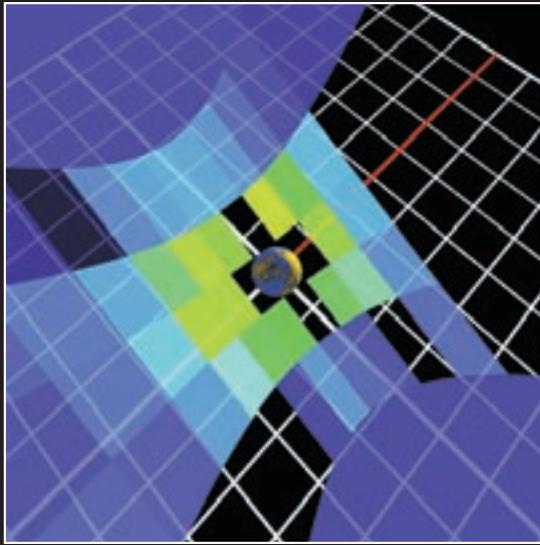
POLAR CEPPAD/IPS ENA Images

October 6, 2000

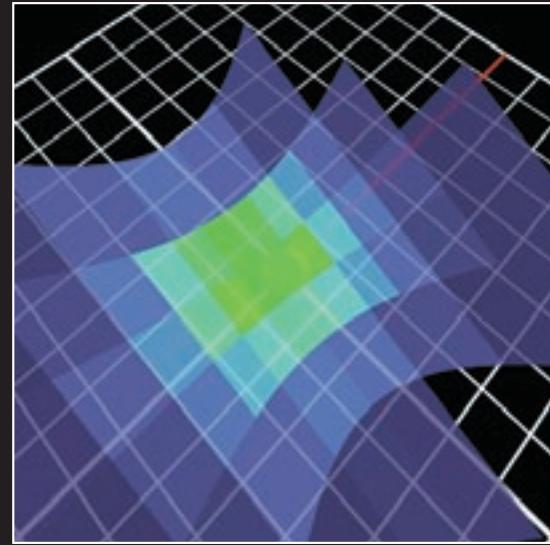


ENA Inversion based on POLAR 0408:29 UT, October 6, 2000

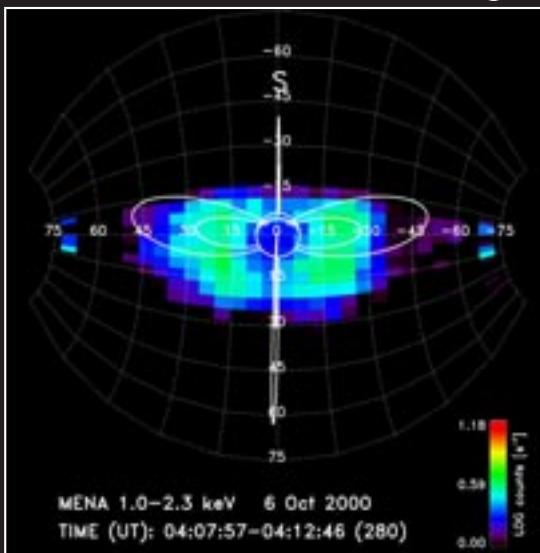
Observed POLAR Image



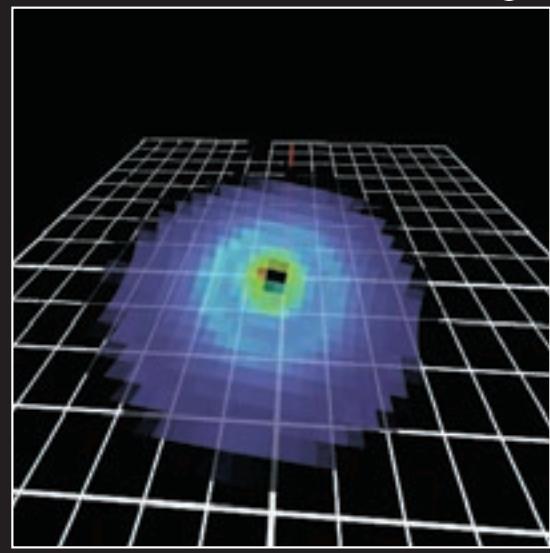
Modeled POLAR Image



Observed MENA Image



Modeled IMAGE Image



Conclusions

- The October 4-6 storm is a very interesting event
 - very steady IMF conditions produced a sequence of “sawtooth” injections seen in LANL & ENAs
 - two intervals of more intense Bz produced further decreases in Dst and more complex dynamics
 - very quiet conditions on October 6 when the IMF went north, allows study of the recovery phase
- The POLAR/IPS, and IMAGE MENA & HENA clearly show each of the “sawtooth” injections on October 4 and agree well
 - the injections are mostly confined to the pre-midnight sector
 - they do not produce a symmetric ring current although $Dst < -150 \text{ nT}$
- Good quantitative comparisons of the ENA images can be made by:
 - inverting the POLAR and IMAGE ENA images separately and together to obtain three descriptions of the source, trapped ion distributions, and
 - comparing the results to determine how well the observations constrain the models

